r=.405464 miles per hour, a=6.532 miles per hour, d=47.0148 miles per hour, AB=13.4857 miles, AC=28.29 miles, and AD=76.17 miles.

Similarly solved by *Professor G. B. M. ZERR*, and solved under a different interpretation by *P. S. BERG, J. F. W. SCHEFFER*, and *J. W. WATSON*.

17. Proposed by G. B. M. ZERR, A. M., Principal of High School, Staunton, Virginia.

A sum of P dollars is loaned at r per cent. interest. At the end of the first year a payment of x dollars is made; and at the end of each following year the payment is made greater by m per cent. than the preceding year. If the sum is paid in n payments, find x.

Solution by ALFRED HUME, C. E., D. Sc., Professor of Mathematics, University of Mississippi, University P. O., Mississippi.

Let $R=1+r$, $M=1+m$.

Amt. owed after 1st. payment $=PR-x$.

.. .. .. 2nd. .. $=(PR-x)\mathrm{R}-xM=PR^2-xR-xM$.

.. .. .. 3rd. .. $=PR^3-xR^2-xMR-xM^2$.

.. .. .. 4th. .. $=PR^4-xR^3-xMR^2-xM^2R-xM^3$.

.....

.. .. .. nth. .. $=PR^n-x(R^{n-1}+MR^{n-2}+M^2R^{n-3}+\ldots.M^{n-2}R+M^{n-1})$.

If n payments cancel the debt, this $=0$. The quantity in the parenthesis is a geometrical progression, the first term being R^{n-1}, the ratio $\frac{M}{R}$, the number of terms n.

$$\text{The sum is } \frac{R^{n-1}\left[\left(\frac{M}{R}\right)^n-1\right]}{\frac{M}{R}-1}=\frac{M^n-R^n}{M-R}.$$

$$\therefore \frac{M^n-R^n}{M-R}x=PR^n,$$

$$\text{and } x=\frac{M-R}{M^n-R^n}PR^n=\frac{(m-r)(1+r)^n}{(1+m)^n-(1+r)^n}P.$$

Also solved by *Professors SCHEFFER, WHITAKER*, and *ZERR*.

18. Proposed by WILLIAM E. HEAL, Member of the London Mathematical Society, Marion, Indiana.

Two railroad trains, lengths m and n, meet at a siding, length l. How shall the trains pass if $l<m<n$?

Solution by W. H. CRALLE, Department of Mathematics, Hogsett Academy, Danville, Kentucky.

Divide train m into sections l or less in length, and with its engine pull its first section on siding; then let engine of n take its train beyond the switch, attach to next section of m and back it till rear of n clears the switch; then let engine of m pull its first section above the switch; then let n back on to switch and beyond, leaving second section of m on switch; next, let engine of n pull its train again beyond switch; then engine of m backs first section into switch and pulls off the second section. This operation is repeated $\frac{m}{l}$ times